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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,937	02/03/2006	Chul-Woo Kim	HANOL-09641	7099

72960 7590 05/11/2009

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EXAMINER	
RIGGS II, LARRY D	
ART UNIT	PAPER NUMBER
1631	
MAIL DATE	DELIVERY MODE
05/11/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/510,937	KIM ET AL.	
	Examiner	Art Unit	
	LARRY D. RIGGS II	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-20 in the reply filed on 06 February 2009 is acknowledged.

Claims 21 and 22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 06 February 2009.

Status of Claims

Cancellation of claims 21 and 22 is acknowledged. Claims 1-20 are currently pending and under consideration.

Claim Rejections - 35 USC § 112, First Paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for differentiating proteins from a sample and a proteome standard, does not reasonably provide enablement for determining whether a person is normal or has cancer. The specification does not enable any person skilled in the art to which it pertains, or with which it is

most nearly connected, to use the invention commensurate in scope with these claims.

In *In re* Wands (8 USPQ2d 1400 (CAFC 1988)) the CAFC considered the issue of enablement in molecular biology. The CAFC summarized eight factors to be considered in a determination of "undue experimentation." These factors include: (a) the quantity of experimentation necessary; (b) the amount of direction or guidance presented; (c) the presence or absence of working examples; (d) the nature of the invention; (e) the state of the prior art; (f) the relative skill of those in the art; (g) the predictability of the art; and (h) the breadth of the claims.

In considering the factors for the instant claims:

a) In order to use the claimed invention one of skill in the art must compare a serum proteome pattern from an individual of interest with a proteome standard which comprises serum proteomes of normal individuals and individuals having cancer. For the reasons discussed below, there would be an unpredictable amount of experimentation required to practice the claimed invention.

b) The specification describes providing a proteome of a subject and a proteome standard consisting of a database from healthy and cancerous samples, wherein the a disease analysis means comprising a genetic algorithm and support vector mechanism or fuzzy rule-based classification, compares the proteome pattern of the subject with the pattern of the proteome standard to determine if the subject proteome is healthy or otherwise cancerous, therein the subject is then identified as having cancer and prognosis state and prognosis

cancer is predicted, or if the individual does not have cancer, to predict the probability of future cancer development, (see specification page 11, line 7 – page 12, line 9; page 19, second paragraph; page 20, last paragraph). The specification provides Table 1 that encompasses spots of particular molecular weights derived from serum proteomes of subjects with breast cancer that may be used for diagnostic screening of breast cancer, (pages 17-18). The description does not provide specific and/or detailed guidance to determine if a subject proteome is healthy or cancerous and likewise to correlate the proteome to determine that the subject is cancerous or have a probability of future cancer development.

c) The description provides a working example of differentiating a proteome pattern of a subject with a standard proteome pattern. The description does not provide working examples of a genetic algorithm, support vector mechanism or fuzzy rule-based classification determining that a proteome is cancerous, how do determine the subject is cancerous, estimating a probability of further cancer development, identifying the development of cancer or how the proteome standard produced from subjects with breast cancer would provide cancer markers or proteome standards to enable the determination that serum proteome of a subject has any cancer.

d) The nature of the invention, cancer detection and prediction from a serum proteome, is complex.

e) The prior art does not show reliable detection and prediction of cancer from a serum proteome using a 2 dimensional analysis such as 2D gel

electrophoresis. Petricoin et al. (Trends in Biotechnology, Review, 2002, 20(12) Suppl., S30-S34) discloses that such detection and prediction of cancer using 2D gel electrophoresis and serum proteome are extremely difficult and are generally unreliable (for example, see page S30, right column, first paragraph; S31, last paragraph – S32, left column, first paragraph). Furthermore, even if 2D gels could quickly and reliably differentiate proteins, Petricoin et al. discloses that the serum proteome is largely unexplored and contains thousands of important proteins and protein fragments that may contain a cancer biomarker making it extremely difficult if not impossible to identify by 2D gels, (S31, last paragraph – S32, left column, first paragraph). Likewise, Alaiya et al. (Electrophoresis, 2000, 21, 1210-1217), discloses that while it is relatively easy to match groups of proteins across gels, the processes of spot detection, spot counting, quantitation and matching is limited, especially with highly heterogeneous samples or 2D gels produced with different experiments or various pH ranges. Alaiya et al. discloses that manual editing and re-evaluation of autotasks will always be required with 2D gels, (page 1213, right column, second paragraph).

f) The skill of those in the art of cancer research is high.

g) The predictability of a subject's serum proteome to enable the determination that the serum proteome is cancerous and the subject has any cancer or the ability to predict the probability of a subject having any cancer is not described in the prior art. Correlation of spots is not causation of cancer and such correlation is not described in the prior art.

h) The claims are broad in that they are drawn to determining from a

subject's serum proteome that the subject has any cancer or the ability to predict the probability of a subject having any cancer does not bear any resemblance in to any previously characterized cancer markers with a particular cancer at a particular stage of that cancer, and identity of a serum proteome pattern to establish that the subject has any cancer, despite the stage of cancer, despite any underlying health issues of the subject, whether the subject is male, female, old, young, a different race, etc. and to be able to predict the probability of whether the subject is to get any cancer is not established.

The skilled practitioner would first turn to the instant description for guidance in using the claimed invention. However, the description lacks clear evidence of enabling the reliable prediction of any cancer from a serum proteome pattern. As such, the skilled practitioner would turn to the prior art for such guidance, however the prior art provides that such prediction mechanisms are extremely difficult, generally unreliable and the markers of all cancers are unknown. Finally, said practitioner would turn to trial and error experimentation to determine a reliable prediction of any cancer from a serum proteome. Such amounts to undue experimentation.

Claims 1-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites “input means for inputting serum proteome” in line 3, “proteome standard production means for generating a proteome standard” in line 4, “proteome comparison means for mapping the serum proteome pattern of the subject, extracted by the proteome standard production means, with the proteome standard pattern” in lines 9-10, “disease analysis means for estimating the serum proteome of the subject as normal....and otherwise, as having cancer....based on the proteome comparison means", in lines 12-15, "output means for outputting the analysis result by the disease analysis means” in line 16.

Claim 6 recites “coding means for coding personal information of normal individuals and individuals having cancer" in lines 2-3.

Claim 7 recites “pre-processing means for obtaining meaningful feature data from the two-dimensional images of serum proteome” in lines 2-3, “evolutionary classification means for identifying normality of a serum proteome of a subject” in lines 3-4.

Claim 8 recites “fuzzy rule-based classification means for extracting correlations between spots contained in the serum proteome" in lines 2-3.

Claim 9 recites “data mapping means for computing correlations between spots from the two-dimensional images of serum proteome” in lines 2-3.

Claim 10 recites "image processing means for performing general image processing works" in line 2, "feature extraction means for extracting features of spots from the image-processed two-dimensional images” in lines 4-5.

Claim 11 recites “genetic algorithm processing means for discriminating optimal feature data among the feature data extracted by the pre-processing means” in lines 2-3, “support vector mechanism application means for estimating fidelity of the optimal feature data discriminate by the genetic algorithm processing means” in lines 3-5.

This “means-plus-function” recitation invokes 35 USC 112, sixth paragraph, MPEP 2181(II):

> 35 U.S.C. 112, sixth paragraph states that a claim limitation expressed in means-plus-function language “shall be construed to cover the corresponding structure…described in the specification and equivalents thereof.” “If one employs means plus function language in a claim, one must set forth in the specification an adequate disclosure showing what is meant by that language. If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112.” In re Donaldson Co., 16 F.3d 1189,1195, 29 USPQ2d 1845, 1850 (Fed. Cir. 1994) (in banc).

In the instant case, the specification fails to set forth an adequate disclosure showing what is meant by

“input means for inputting serum proteome”, “proteome standard production means for generating a proteome standard”, “proteome comparison means for mapping the serum proteome pattern of the subject, extracted by the proteome standard production means, with the proteome standard pattern”, “disease analysis means for estimating the serum proteome of the subject as normal....and otherwise, as having cancer....based on the proteome comparison means", "output means for outputting the analysis result by the disease analysis means”, “coding means for coding personal information of normal individuals and

individuals having cancer", “pre-processing means for obtaining meaningful feature data from the two-dimensional images of serum proteome”, “evolutionary classification means for identifying normality of a serum proteome of a subject”, “fuzzy rule-based classification means for extracting correlations between spots contained in the serum proteome", “data mapping means for computing correlations between spots from the two-dimensional images of serum proteome”, "image processing means for performing general image processing works”, "feature extraction means for extracting features of spots from the image-processed two-dimensional images”, “genetic algorithm processing means for discriminating optimal feature data among the feature data extracted by the pre-processing means”, “support vector mechanism application means for estimating fidelity of the optimal feature data discriminate by the genetic algorithm processing means”.

Thus, one of skill in the art would reasonably doubt that the inventor, at the time the application was filed, had possession of the claimed invention.

Claim Rejections - 35 USC § 112, Second Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-20 are rejected under 35 U.S.C. 112 , second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 6-11 recite “means-plus-function” limitations, thus invoking 35 USC 112, sixth paragraph.

The MPEP 2181(II) states:

> *If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112." In re Donaldson Co., 16 F.3d 1189, 1195, 29 USPQ2d 1845, 1850 (Fed. Cir. 1994) (in banc).*

In the instant case, the specification does not provide an adequate disclosure showing the structure, material or acts for these “means-plus-function” limitations, for reasons as set forth above. Thus, one skilled in the art would not know what are meant by these “means-plus-function” limitations, and the metes and bounds of the claimed invention are thus not clear.

Claim 1 recites the limitation "the subject is ‘normal’ if the serum proteome pattern ….would be similar to that of the normal individuals" and “otherwise, as ‘having cancer’", in lines 12-14. The metes and bounds of the limitation are unclear. One skilled in the art would be unclear what significance the elements of "normal" and "having cancer" in quotations may be, as opposed to the elements not having quotations. Neither the specification nor the claims provide an alternative to the ordinary meaning of the limitations.

Claim 7 recites the limitation, “obtaining meaningful feature data” in lines 2-3. The metes and bounds of the limitation are unclear. Neither the specification nor the claims provide a clear and precise definition of “meaningful feature data” and one skilled in the art would be unclear what criteria or parameters would allow one to distinguish “meaningful” data from other data.

Claim 12 recites the limitation, "determining whether the serum proteome of the subject is normal or abnormal, that is, indicative of cancer" in lies 10-11. The metes and bounds of the limitation are unclear. The use of the phrase “that is” makes one skilled in the art unclear whether determination of serum proteome as normal or abnormal defines that the there is cancer, a possibility of cancer, a projection of cancer in the future, etc.

Claim 17 recites the limitation, “classifying the serum proteome of the subject into “normal” or "having a disease" by applying features and estimation functions..." in lines 3-4. The metes and bounds of the limitation are unclear. One skilled in the art would be unclear what significance the elements of "normal" and "having a disease" in quotations may be, as opposed to the elements not having quotations. Neither the specification nor the claims provide an alternative to the ordinary meaning of the limitations.

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LARRY D. RIGGS II whose telephone number is (571)270-3062. The examiner can normally be reached on Monday-Thursday, 7:30AM-5:00PM, ALT. Friday, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Marjorie Moran can be reached on 571-272-0720. The

fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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